

TORREYA

Vol. 28

No. 1

January-February, 1928

THE PERIOD OF ANTHESIS IN HIBISCUS

ALEXANDER F. SKUTCH AND ROBERT L. BURWELL, JR

A small fresh-water marsh, separated by a narrow, wooded neck of sandy soil from the brackish waters of the estuarine Severn River on the western shore of Maryland, was from late July until mid September bright with the showy blossoms of hibiscus. Growing side by side in the oozy, black soil were plants which produced flowers of four different color combinations. The crimson-eyed hibiscus (*Hibiscus oculiroseus* Britton), named from the crimson patch in the center of the large, white corolla, was present in the greatest abundance. Scattered among this grew a hibiscus with a delicately rose-tinted corolla, the swamp rose-mallow (*H. Moscheutos* L.). In addition to these were plants which produced flowers with pure white corollas, and others the petals of which had the rose tint of the rose-mallow, except for the crimson eye of *H. oculiroseus* at the center of the flower. The plants which bore these four distinct types of blossoms could not be distinguished in the field by vegetative characters, and the only obvious difference between the flowers was in the color of the petals, which in all of the forms were 8-9 cm. long. Bailey* considers it probable that *H. oculiroseus* is a variety of *H. Moscheutos*. The other types may possibly be hybrids between the two more common forms which have been given specific rank.

The blossoms of hibiscus are among the largest in our native flora, and for this reason their diurnal periodicity is very spectacular. If in the evening we mark in some fashion the largest flower buds of one of these swamp hibisci, choosing only those of which the convolute corolla projects beyond the partially opened calyx, we shall find that most, if not all, of them will open on the following morning. In mid August, by 7:30 or 8 A. M. they have unfolded to practically their fullest extent. During the

* Bailey, L. H. Manual of Cultivated Plants. New York, 1924.

day they are visited by bees and occasional butterflies, among which the silver-spotted skipper (*Epagyreus tityrus* Fabr.) is prominent. By four in the afternoon the corollas have closed perceptibly, and by six they are almost completely folded. These flowers will not open on the following morning, but bloom during a single day only. Their period of full bloom is nine hours or less. Out of fifteen flowers which had been marked, three shed the furred corollas on the day after blooming, while most of the remainder fell during the following night, the second since their anthesis.

If the pollination of the flowers is prevented, the behavior of the corollas is quite different from that sketched above. At 9 P. M. on August 12, eight large buds were enclosed in mosquito netting bags, and of these, seven were in full bloom at noon on the following day. They did not close that evening along with the unprotected flowers, but remained open during the entire night of August 13-14. At 10 A. M. on August 14 four of the bags were removed and pollen was transferred on a small brush to the stigmas of these flowers, while the remaining three were left inside the bags to serve as controls. On the evening of the same day the artificially pollinated flowers, which had been open continuously for about thirty-two hours, closed along with the undisturbed, insect-pollinated flowers which had come into bloom that same morning. The unpollinated flowers were still open on the following day.

The normal behavior of the flowers of the shrubby althaea (*H. syriacus* L.) of our hedgerows and flower gardens is practically the same as that of the swamp hibisci. Each blossom remains open but a single day. After closing the corollas generally remain attached to the réceptacle for a longer period than in the case of the marsh-inhabiting species, and often dry up over the pod instead of falling while still fresh. The corolla of *H. Trionum* L., aptly called the flower-of-an-hour, has normally, according to Kerner,* a period of bloom of about three hours, which makes it the most ephemeral of all the species recorded in this author's table of duration of anthesis.

The difference between the pollinated and the unpollinated flowers of hibiscus raises a question in regard to the above-

* Kerner von Marilaun, Anton, The Natural History of Plants, trans. by F. W. Oliver. New York, 1895. See half-volume III, p. 213.

mentioned table in Kerner's "Pflanzenleben," and indeed to observations on the period of anthesis as far back as the famous "floral clock" of Linnaeus. In compiling this list no attention seems to have been given to the time which elapsed between the beginning of anthesis and pollination, and no distinction was made between pollinated and unpollinated flowers. Thus for native European species, most of which would be accessible to their normal insect visitors, a short period of anthesis is as a rule recorded, while the exotic orchids are credited with periods of several weeks—60 days in the case of *Oncidium cruentum*, 70 for *Cypripedium villosum*, 80 for *Odontoglossum Rossii*, etc. We know from the work of Fitting* that the corollas of orchids (at least those which do not turn green after fertilization) fall very soon after pollination, and this irrespective of the period which has elapsed since they first came into flower. Hence we may safely assume that the orchids for which Kerner records the long periods had not been pollinated. The problem of how the presence of the pollen affects the corolla, often at a considerable distance, has not been solved. We know from much recent work that stimuli are transmitted through the plant body by means of hormones, which either diffuse through the tissues, or are more rapidly carried in the transpiration stream. However, there is at present no conclusive evidence that such plant hormones are active in bringing about postfloration changes in flowers, although we may assume this to be the case.

A morphological peculiarity worthy of notice in *H. Moscheutos* and some allied species is the elevation of the leaf-like bracts upon the pedicels which are axillary to them. In other words, the leaf, which is normally situated upon the main stem, and from the axil of which the pedicel springs, appears in the examples in question to grow from the lower side of the pedicel at a considerable distance from the stem. There is great variability in regard to this feature even between the different pedicels of the same inflorescence. In some the bracts are situated upon the main axis in the normal position, while in others they are seated upon the pedicel 2 cm. above its connection with the stem, and all intermediate conditions occur. A similar situation may be observed with more regularity in the water pimpernel (*Samolus*

* Fitting, Hans, Die Beeinflussung der Orchideenblüten durch die Bestäubung und durch andere Umstände. Zeitschrift für Botanik, Bd. I, S. 1, 1909.

floribundus H. B. K.), which grows close by hibiscus on the shores of the Severn. In such cases the botanical rule that branches are axillary to leaves is not departed from so flagrantly as appears at first sight. It is usually found that early in its development



FIGURE 1. A portion of the hibiscus swamp at noon, August 10, 1927. At the left are two flowers of the crimson-eyed hibiscus in full bloom. To the right are several blossoms of the variety with pure white corollas. Just below the center of the figure is a drooping, closed corolla which had been open the previous day.

the branch is actually in the axil, but elongation sets in at the base of both bract and pedicel, where the two are in contact. As this region where they are united increases in length, the bract is borne away from the stem until it appears to spring directly from the pedicel, but its basal continuation may often be followed down the pedicel to the main axis.

THE JOHNS HOPKINS UNIVERSITY,
BALTIMORE, MD.

A NEW DEERBERRY FROM THE GULF REGION

JOHN K. SMALL

In the course of two excursions across the southern parts of the eastern Gulf States a peculiar-looking deerberry (*Polycodium*) was frequently observed growing on the hills from western Florida to Louisiana. The plants or colonies were always less than knee-high. They comprised short erect foliage and floral branches, the former evidently the floral branches of the succeeding year. As this plant does not seem referable to any of the described species, it may be known as:—

✓ ***Polycodium depressum*** Small, sp. nov. A shrub with several or many erect branches 1–3 dm. tall, the twigs, especially those of the leafy shoots closely fine-pubescent: leaves rather close together; blades elliptic or nearly so, individually sometimes broadly so, 2–5.5 cm. long: racemes spreading or ascending, mostly 4–7 cm. long, the rachis and pedicels copiously fine-pubescent: bracts only a fraction as large as the leaves, otherwise similar to them: hypanthium densely pale-pubescent: sepals ovate to triangular, nearly or quite 2 mm. long, obtuse or merely acute, pubescent: corolla white, about twice as long as the calyx; lobes deltoid to ovate-deltoid, slightly shorter than the tube, obtuse: stamens about 7 mm. long; filament pubescent; anther with slender tubular appendages fully twice as long as the sacs, the spur-like appendages about as long as the sacs: ovary glabrous: style subulate, glabrous: berry.

Pinelands, northern Florida to southern Louisiana.—Spring. Type from near Silverhill, Alabama, Small, Mosier, and Matthaus. —, May 3rd, 1926,

The low habit of this *Polycodium* separates it from all the other species of the genus. In the floral characters it is related to *Polycodium melanocarpum* and *P. macilentum*. The size of the flower is somewhat intermediate between those of these species. It differs from both in the obtuse or merely acute sepals.

NEW YORK BOTANICAL GARDEN.